REMARKS

Drawings

The drawings are objected to because the figures are improperly cross hatched. Formal drawings that correct this informality are submitted herewith.

Claim Objections

Claims 3, 4, and 22 are objected to for lack of antecedent basis. Changes have been made to Claims 4 and 22 to overcome the objections. As to Claim 3, Applicants believe that there is no antecedent basis problem and is unclear as to the reason for the objection. However, Applicants replaced "sites" to "a site" and made changes in accordance with this replacement in the hopes that this will overcome the objection.

Oath/Declaration

A supplemental declaration submitted herewith identifies the mailing address of the inventor.

Claim Rejections – 35 U.S.C. § 112

Claims 10 and 22 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 has been amended to clarify the intended subject matter. No new matter has been added, as the amendment is supported by the specification (e.g., page 5, lines 18-19). Claim 21 has been amended for consistency with Claim 10.

Claim 22 has been amended to identify the insulating material.

Claim Rejections – 35 U.S.C. § 103

1. Uematsu

Claims 1-2 and 8-12 are rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 5,847,453 to Uematsu et al. ("Uematsu").

Claim 1 is patentable over Uematsu at least because it recites that "each of the coaxial vias and the base form a substantially flat surface." As described in the specification (for

example, in Figure 2), the coaxial via (which includes regions 2 and 3) and the base (region 1) form a substantially flat surface. This flat surface stands in stark contrast to Uematsu's pin (e.g., DC terminal 34) that protrudes from both surfaces of the base plate. The "substantially flat" characteristic of the invention allows both the coaxial via and the base to be coated with a conductive layer (such as conductive layer 2 in Figure 2). The conductive layer is deposited on this flat surface such that it covers substantially all of the central contact area of the coaxial via and some of the insulating ring that surrounds the central contact area. As a result, the conductive layer that is electrically coupled with the central contact layer has a larger diameter than the central contact area itself. The conductive layer having a larger diameter than the central contact area is advantageous not only because it facilitates solder bonding the package to a printed circuit board but also because it helps maintain the desired characteristic impedance. As controlling the impedance level has been a challenge for conventional packages when used with high frequency devices, the ability to maintain the desired characteristic impedance makes the package of the invention especially suitable for high-frequency devices. In Uematsu's device, the DC terminal protrudes from the surface of the base, making it difficult, if not impossible, to coat the DC terminal with a conductive layer of a different diameter. Furthermore, the protruding DC terminal makes it difficult to solder the base to a printed circuit board. Therefore, this feature of Claim 1 is not suggested by Uematsu and Claim 1 is patentable over Uematsu.

Furthermore, Uematsu's configuration is very similar to insulated pins in a metal package containing hermetic glass rings that are used widely in the industry. The fact that the flat-base configuration of the invention was never practiced even though the protruding-pin package has been widely used indicates that the claimed flat-base configuration is not obvious.

Claim 2, which depends from Claim 1, is patentable over Uematsu at least for the same reason that Claim 1 is patentable. Furthermore, Claim 2 is patentable over Uematsu for the additional reason that it recites, "the central conductive contact area, the insulating material ring around the central conductive contact area, and the base form a coaxial via connection." By definition, a "coaxial connection" includes two regions that electrically connect to one device to another. For example, the well-known "coaxial cable" consists of a tube of electrically conducting material surrounding a central conductor [The Merriam-Webster Dictionary, 50th Anniversary Edition, 1997]. In the feature of Claim 2, the two conductive regions are 1) a

conductive layer (e.g., a tin layer) deposited over the central conductive contact area and a part of the surrounding insulating ring, and 2) the base. In contrast, there is no indication that the base plate of Uematsu is soldered to or electrically coupled to the printed circuit board. It appears that only the DC terminal connects to an outside device. Thus, there is no "coaxial connection" in Uematsu. Furthermore, even if the base plate were to be electrically coupled to an outside device, the insulators that electrically isolate the DC terminal from the base plate would not be a part of the coaxial connector because the only role it plays is to keep the two conductive regions separate. Thus, even if Uematsu's configuration involves a "coaxial connection," it still does not fulfill the limitation of "the central conductive contact area, *the insulating material ring around the central conductive contact area*, and the base" forming a coaxial via connection.

Claims 8-12, which depend from Claim 1, are patentable over Uematsu for at least the same reason Claim 1 is patentable over Uematsu.

Applicants note that the language of Claim 1 has been changed to clarify the meaning of "a substantially flat base" that was originally recited rather than to narrow the scope of the claim.

2. Combination of Uematsu and Zechman

Claims 3-4, 13-15, 19-22, 31, and 32 are rejected under 35 USC § 103(a) as being unpatentable over Uematsu in view of U.S. Patent No. 5,622,898 ("Zechman"). As neither Uematsu nor Zechman teaches or suggests "one or more coaxial vias formed in the base, wherein each of the coaxial vias and the base form a substantially flat surface," the references, even in combination, do not teach Claim 1. Therefore, Claims 3-4, which depend from Claim 1, are patentable over a combination of Uematsu and Zechman.

Claim 13 is patentable over a combination of Uematsu and Zechman because it recites, "at least one coaxial via that forms a substantially flat surface with the base." Neither Uematsu nor Zechman teaches or suggests a coaxial via that forms a substantially flat surface with the base. As explained above, Uematsu teaches a DC terminal that protrudes from the base at both ends. Zechman, which teaches a chip composite, does not suggest using a coaxial via of any kind. Therefore, Uetmatsu and Zechman, even in combination, do not teach all the limitations of Claim 13 and Claim 13 is patentable. Claims 14-15 that depend from Claim 13 are patentable over a combination of Uematsu and Zechman for at least the same reason Claim 13 is patentable.

Likewise, Claims 19-22, which depend from Claim 13, are patentable for at least the same reason Claim 13 is patentable.

Claims 31 and 32 are patentable over a combination of Uematsu and Zechman because they recite, "the central conductive contact area, the insulating material ring around the central conductive contact area and the base form a coaxial via connection." As explained above, a conductive layer is deposited on selective regions of the central conductive contact area, the insulating material ring, and the base to form a coaxial via connection. The conductive layer changes the effective diameter of the central conductive contact area, achieving the desired impedance level that is appropriate for high-frequency devices. The insulating ring allows the enlargement of the effective diameter of the central conductive contact area by allowing the conductive layer to be deposited thereon. In contrast, in Uematsu's device, only the DC terminal is electrically coupled with an external device and there is no indication that the base plate or the insulators form a part of the coaxial via.

3. Combination of Uematsu, Zechman, and Yamazaki

Claims 5-7 and 16-18 are rejected under 35 USC § 103(a) as being unpatentable over the combination of Uematsu and Zechman in view of U.S. Patent No. 6,191,492 ("Yamazaki"). Claims 5-7 depend from Claim 1, and are patentable over the combination of Uematsu, Zechman, and Yamazaki at least because they recite, "the coaxial vias and the base form a substantially flat surface." As explained above, Uematsu does not teach or suggest this limitation because the DC terminal in Uematsu's configuration extends from the surface of the base. Zechman does not teach or suggest a coaxial via of any type. Likewise, Yamazaki, which teaches a method of densifying the outer surface of a chip package, does not teach or suggest a coaxial via of any type. Thus, a combination of Uematsu, Zechman, and Yamazaki does not teach or suggest all the limitations of Claims 5-7, and Claims 5-7 are patentable.

Claims 16-18, which depend from Claim 13, are patentable over the combination of Uematsu, Zechman, and Yamazaki at least because they recite, "at least one coaxial via that forms a substantially flat surface with the base." As explained above with respect to Claims 5-7, Uematsu, Zechman, and Yamazaki, even in combination, do not teach this limitation. Thus, Claims 16-18 are patentable over the combination of Uematsu, Zechman, and Yamazaki.

New Claims

Dependent Claims 33 and 34 are newly added. These claims, which are patentable for at least the same reason Claim 1 and Claim 2 are patentable, clarify a difference between the invention and Uematsu by describing how the diameter of the central conductive contact area is effectively enlarged by the conductive layer 2. As this is described in the specification (e.g., Figure 2 and page 6, lines 3-8), no new matter is added.

Conclusion

Applicant believes that all the pending claims are in condition for allowance. If the Examiner wishes to discuss any aspect of this application, the Examiner is invited to telephone Applicants' undersigned attorney at 650-320-7536.

Any fee due for this Amendment may be charged to Deposit Account No. 07-1896.

Respectfully submitted,

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ATTACHMENT A

(A marked-up version of the specification indicating changes made)

Please amend the paragraph starting at page 4, line 17 as follows:

The invention is particularly applicable to microwave device packaging and it is in this context that the invention will be described. It will be appreciated, however, that the high frequency device package and packing method in accordance with the invention has greater utility since it can be used to package any device that operates [a] at high frequencies or any device in which matched impedance vias and bonding wires are desirable.

Please amend the paragraph starting at page 8, line 7 as follows:

[An] A few additional steps/operations might be done in Step A to improve the via conductor bonding performance. For example, the adhesive layer 31 may be based on aluminum deposition wherein the aluminum is used as a sacrificial layer. Then, after the insulating via rings 32 have been formed, the exposed aluminum is coated with a thin layer of gold and possibly a subsequent nickel layer to improve bondability and aging characteristics.

ATTACHMENT B
(A marked-up version of Claims indicating changes made)

1. (Amended) An electrical component package comprising a [substantially flat] base to accommodate one or more electrical components on its surface and one or more coaxial vias formed in the base, wherein each of the coaxial vias and the base form a substantially flat surface for input/output of electrical signals from the electrical component.

3. (Amended) The package of Claim 2, further comprising one or more coaxial wires, each wire connecting [sites] a site on said component to one of the one or more coaxial vias.

4. (Amended) The package of Claim 3, wherein each of the one or more coaxial wires further comprises a conductive bonding wire, a conformal coating of insulating material that surrounds the conductive bonding wire and a conductive layer that coats the coating of insulating material to form a coaxial structure.

10. (Amended) The package of claim 1, wherein the base further comprises a material [that is thermally matched] having a thermal expansion coefficient that matches with thermal expansion coefficient of the one or more electrical components to be mounted on the base.

13. (Amended) A structure comprising an electrical device having at least one conductive pad, a base material to which the electrical device is mounted wherein the base has at least one coaxial via that forms a substantially flat surface with the base, and a micro-coaxial wire connecting said pad to a conductor in said coaxial via to provide a coaxial signal path from the electrical device to the coaxial via.

21. (Amended) The structure of claim 13, wherein the base further comprises a material [that is thermally matched] having a thermal expansion coefficient that matches with thermal expansion coefficient of the one or more electrical components to be mounted on the base.

22. (Amended) The structure of Claim 15 further comprising a conductive coating applied to the outside of the insulating material wherein said conductive coating is electrically attached to [the] a shield side of said coaxial via.